Forest Industry Guide to the Preparation and Submission of Forest Tenure and Permit Documents via the Electronic Submission Framework (ESF)

December 1, 2003

BRITISH COLUMBIA

Ministry of Forests

Executive Summary

This guide provides forest industry clients with a clear and concise understanding to the process of electronically creating and submitting tenure and spatial data to the Ministry of Forest's, Forest Tenure Administration (FTA) application. It also explains the technical requirements, standards and processes of the Electronic Submission Framework (ESF) in a manner that is easy to understand and follow from the client perspective.

References to key documents detailing the technical aspects of electronic submissions are made but do not intend to duplicate existing source materials. This guide also provides tips and advice that will make the process of creating, managing and submitting forest tenure applications straightforward.

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1 Introduction

1.1 Intent of the Guide

This guide intends to be a non-technical document that describes the linkages between the forest industry business processes governed by legislation, policy and regulation and the supporting technology and processes for electronic submissions to the Ministry of Forests (MoF).

This guide familiarizes the user with the technology required to make electronic submissions, explains the data requirements for forest tenure and permit submissions, and details the process for making common types of submissions.

This guide does not intend to provide comprehensive documentation that would enable the user to create an electronic submission document, but rather the intent is to provide background information on the process, issues, and electronic submission options.

Detailed information sources are included where appropriate to help guide the user in finding details on technical specifications and related information.

1.2 Intended Audience

This guide targets for forest licensee managers, foresters and technical staff (forest development and support staff), as well as service providers who are responsible for producing and managing submissions and requests for forest tenure and/or permits on behalf of a licensee. For example, this guide is useful to forest engineers responsible for applying for road permits, operational foresters responsible for development of site plans and approval of cutting permits and forest health foresters responsible for applying for salvage permits. Mapping and information management support staff will find this guide useful for understanding the mapping and information management related issues.

This guide intends to provide direction to licensees who use varying levels of information technology to support their forest operations. It provides insight into approaches to use in supporting electronic submissions for all types and complexities of forest data management systems, even where very limited data management technology is currently being used.

1.3 How the guide is organized

This guide is organized into 3 main sections:

- Section 1 provides an introduction,
- Section 2 provides a general overview of electronic submissions, and
- Section 3 provides information specific to making forest tenure and permit submissions. Submission examples made in various common situations are provided.

Appendixes provide more technical details on formatting data and tools available to help prepare submissions.

2 Introduction to Electronic Submissions

Electronic submissions to the Ministry of Forests (MoF) are part of a province-wide initiative of the British Columbia government to improve service delivery through the use of electronic business mediums. The Ministry of Forests has identified four key areas within their Electronic Forest Management (e-FM) initiative: electronic services for submissions of regulated information to the ministry (e-Submissions), access to ministry information holdings (e-Access), electronic record management (e-Records), and delivering training and learning opportunities (e-Training). The aim of these initiatives is to streamline business with government in order to gain efficiencies for industry as well as government.

General information on e-FM can be found at: http://www.for.gov.bc.ca/his/esd/
Information on ESF can be found at: http://www.for.gov.bc.ca/his/esf/

The Electronic Submission Framework (ESF) is a component of e-Submissions accessed by MoF clients in order to make silviculture (RESULTS) and forest tenure (FTA) submissions. This is the standard for submitting information to the government, with the goal that each piece of information will only need to be submitted once, even though it may be used for a number of purposes.

The cornerstone of the electronic submission initiative is that all data will be submitted in a non-proprietary format based on current information technology standards. Spatial data (i.e. map information) is in Geographic Markup Language (GML), and all attribute data will be in Extensible Markup Language (XML). Refer to Section 6 for more details. All information submitted to the government must be properly formatted according to the data specifications provided by the MoF.

Detailed data specifications (schema) and a ESF user guide are available on the MOF website: *http://www.for.gov.bc.ca/his/esf/index_resfta.htm*

The MoF has made the use of ESF mandatory policy, directing all licensees to submit tenure/permit information and silviculture information electronically. The transition to ESF started on December 1, 2003 with the goal that all licensees will be submitting electronically by April 1, 2005. During the transition period, MoF will accept customary submissions, and is negotiating with licensees to submit through ESF much earlier than the April 1, 2005 date

2.1 Approaches to Making e-Submissions

Licensees have options available for preparing and managing electronic submissions for forest tenure & permit documents, appraisal documents and silviculture reporting. Two general options for submitting electronically are in-house systems and resources that directly support the creation of the electronic documents required for the applications or the use of qualified service providers capable of preparing and submitting on behalf of a licensee.

References to information management systems that are commonly used by licensees are provided in Appendix A. These systems should enable the licensee to prepare properly formatted electronic submission documents. Other technology tools that can create properly formatted submission documents from less sophisticated systems are also available. These are also addressed in Appendix A.

Utilizing qualified service providers is another option for creating and submitting submissions. A listing of qualified service providers can be found at http://www.for.gov.bc.ca/his/esf/. This approach requires minimal infrastructure, knowledge and experience on the part of the licensee to perform the submissions.

2.2 Security for Electronic Submissions

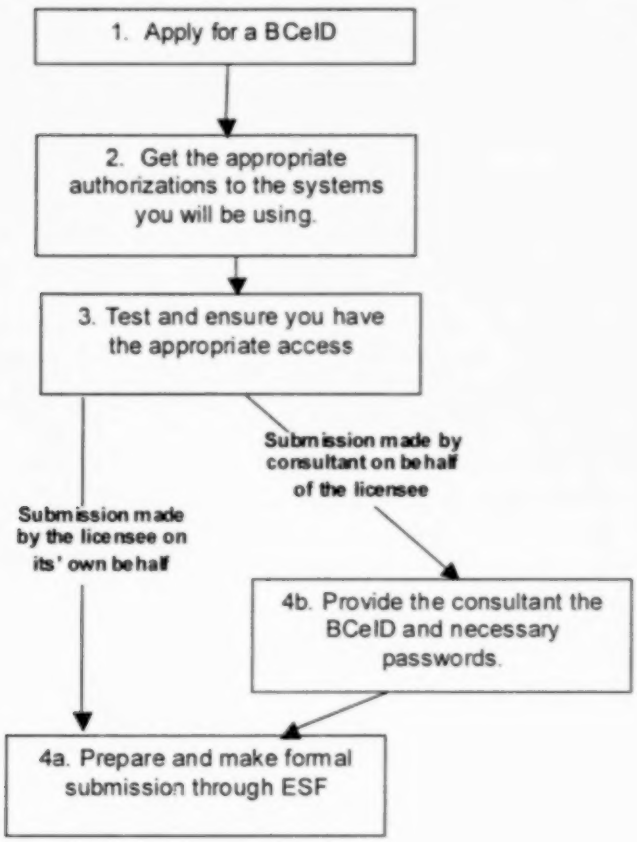

1. Apply for a BCeID
2. Get the appropriate authorizations to the systems you will be using.
3. Test and ensure you have the appropriate access
Submission made by consultant on behalf of the licensee
Submission made by the licensee on its' own behalf
4b. Provide the consultant the BCeID and necessary passwords.
4a. Prepare and make formal submission through ESF

Figure 1 – Steps to obtain secure access to the necessary government computer systems.

Access to all web sites and applications for making electronic submissions to the MoF requires secure access. The Ministry of Forests and the Ministry of Sustainable Resource Management (MSRM) provide a common approach to creation, management and access to government applications for the private sector through BCeIDs. A licensee can apply for a BCeID and have one corporate login for all

Further information on BCeIDs and the use in the BC Government can be found on the following website: https://www.bceid.ca/

To request a BCeID for your company for access to MOF or MSRM resources, refer to http://www.for.gov.bc.ca/his/esd/bceidrequest.htm

To request access to specific applications such as RESULTS or FTA with the Ministry of Forests, refer to http://www.for.gov.bc.ca/his/esd/access.htm

participating government sites. The BCeID account is administered by the individual licensee, and access and authorization for account use is the responsibility of the licensee.

Once a licensee has a valid BCeID, they must request the appropriate access to the appropriate applications for which the licensee will be using. For those making submissions through ESF, access is granted for each individual that will be making submissions. Once a licensee has a BCeID, all connections to BC government submission sites should use the licensee's BCeID.

Access for Consultants

For consulting companies that are preparing and managing submission on behalf of a licensee, access to submit to the BC government is provided by the licensee. To get the necessary access using BCeID as a consultant acting on behalf of a licensee requires the licensee to provide access through their BCeID account to the consulting firm. Submissions cannot be made using a consultant's BCeID and will cause the submission to be rejected. This is necessary as all authorizations to perform tasks for a given licensee are only granted to that specific licensee and management of access is the responsibility of each licensee.

Systems Access Requirements for Forest Tenures

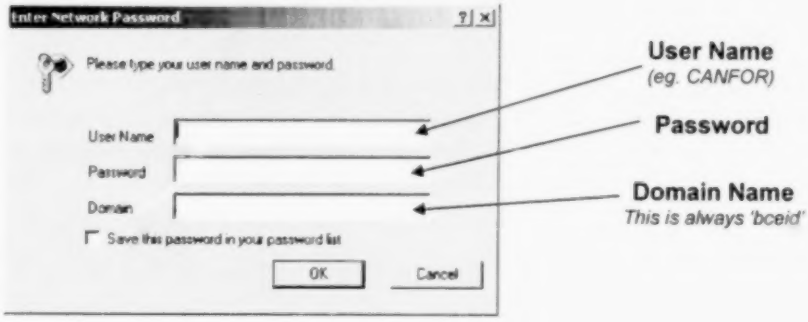
There are three systems that a client will require access for performing all tasks for e-submission of tenure and permit applications. Access to some government systems is automatically granted when related system access is requested. Outlined below are Ministry of Forests systems and the types of access required for making submissions

System	Descriptions	Gaining the required access
Electronic Submission Framework Website	A web site for uploading and reviewing the status of electronic submissions.	To gain access, submit request to the ESF administrator identified on the ESF homepage.
MapView for the Web	Provides an on-line mapping utility to see the information submitted to the ministry with base information including TRIM, Forest cover, and other base information.	Requires BCeID account with permissions for access to the MapView website. This access is automatically provided with requests for access to the Electronic Submission Framework Website.
Tenure Map Service	A web service that allows for spatial data to be submitted and tested for land or resource tenure conflicts prior to making a submission.	Requires BCeID account with permissions for access to the TMS website. To gain access, submit request to the ESF administrator identified on the ESF homepage

Key Points on logging into ESF

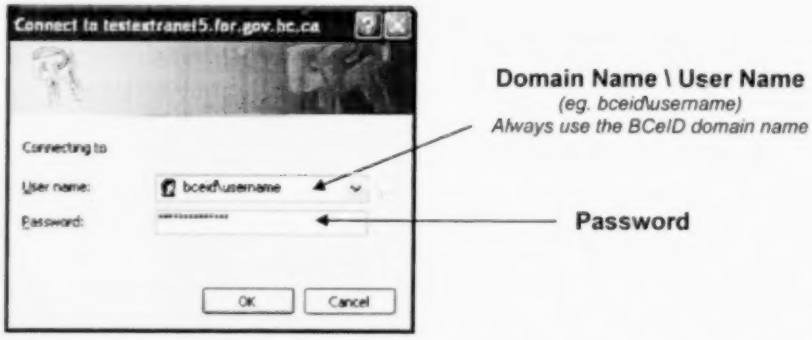
To log into ESF, the user must supply three pieces of information. Depending on the operating system used to connect to the ESF, the user is offered different ways to supply this information. A user must supply a user name (valid BCeID), password and the domain name that they are connecting to. In all cases the domain name will be 'bceid'.

For users of Windows 2000/NT/98
Windows 2000/NT/98 provides three places to enter information on logging into ESF. All three text boxes must be filled in for the user to gain access to ESF.



For users of Windows XP
Windows XP provides only two boxes to supply the necessary information to correctly login to the ESF website. To include all information, the user must include the domain name and the user name in the user name text field separated by a backslash ("\"). Login using the following syntax: *bceid\username*

Keyboards supply a forward slash ("/") and a back slash ("\"). Using a forward slash in the login will cause problems and your login to ESF will fail. Be careful to ensure that a back slash is used when logging in from a Windows XP computer. Many user problems with logging into the site involve users using the wrong slash when attempting to enter the information.



2.3 Technology Required to Access and Use ESF

The process of making electronic submissions to the MoF requires very little technology and no special software. Required technology necessary to make a submission likely already exists on your computer. All that is required to submit a properly formatted submission document is a web browser (such as Microsoft's Internet Explore or Netscape) and a connection to the internet. The process of preparation of the submission document, however, involves specific technology requirements.

The required internet connection for submissions is dependent on the size of the documents being submitted. Generally, all types of internet connections from dial-up to high speed should function reasonably well. Where internet service is limited or unreliable it is recommended to make the submission documents smaller by including only one or maybe two types of submissions (such as 1 cutting permit rather than 15 cutting permits) per document. All internet mapping applications (such as Mapview for the Web or TMS) delivered through the BC government should function reasonably well through dial-up connections as they transmit a minimal amount of data across the connection.

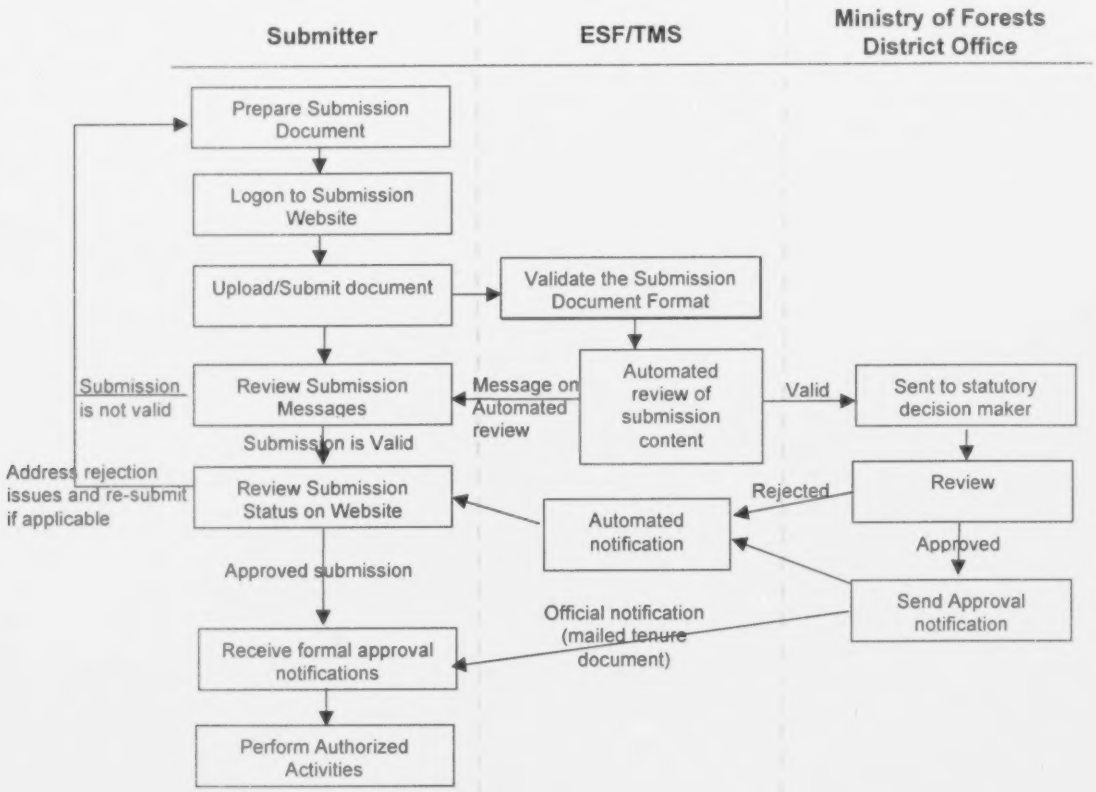
Recommended Web Browsers

Internet Explorer 5 (or newer) or Netscape version 6 (or newer) are recommended when working with the ESF website.

It is important to note the requirements for ***preparation*** of the submission document are different than those technology requirements to submit the prepared document through the web and check on the status of the submission. For a discussion on the tools and approaches to creating properly formatted documents see Section 5 and Appendix B

2.4 Generic Submission Process

No matter what type of application is being made to the MoF, a generic process exists to properly submit and receive notifications through ESF and receiving business application.



Licensee Steps to Submitting an Application

Preliminary Steps

1. *Ensure that all the necessary access and technologies are in-place for your company.*

See Section 2.3 for an overview of the technologies necessary for making electronic submission to the Ministry of Forests. It is also necessary to ensure that the company that is submitting the applications has the appropriate access to the required government computer systems. For details on the required access see Section 2.2.

2. *Gather the necessary information to make the submission document.*

This will include all the digital files, survey information, and contact information required for inclusion in the submission document being prepared. Having all the appropriate information will make the entire process much faster. The types of information required to make submission are identified in the submission content and structure guides available at *http://www.for.gov.bc.ca/his/esf/*. Information and further details on forest tenure and permit submission can be found in Section 3.0 of this guide.

Creation and Submission of the document

1. *Prepare a properly formatted submission document for each application being made*

Preparation of the submission documents could occur through a variety of mechanisms and is dependent on the licensee mapping and information management environment, level of computer and software expertise and the type of submission being made. Appendix A outlines various computer tools and common applications that are utilized for management of forest information in British Columbia and approaches for preparing electronic submissions with these applications.

2. *Logon to the Electronic Submission Website*

Logon to the ESF website requires the proper security access. For information on the required access, see Section 2.2.

3. *Upload/Submit Document*

Prior to submitting a document through the ESF website, it is useful to check for existing land or resource tenure conflicts via TMS(see Section 4 of the guide). Uploading submission files is as simple as selecting the submission type and supplying a properly formatted submission document. During the initial upload stage the submission document can be cancelled from the process.

4. *Review Automated Messages*

Shortly after uploading a submission, the submitter is notified as to whether the submission has been accepted or if automated format verifications and submission content checks have caused the submission to fail. If the submission fails, resolve the issues identified by the messages returned and resubmit the application. If the submission is successful, it will then be forwarded to the statutory decision maker for approval or rejection.

5. *Check Status of Submission*

Official notification of submission approval is made in hardcopy form to meet legal requirements, but non-official electronic notifications are made for the submission from the receiving application and are stored on the electronic submission website. E-mail notifications are sent to the contact identified in the

submission on status changes to a submission, but it is important to check the submission website on the status of applications to confirm state.

If there are any problems associated with a submission, the statutory decision maker may provide additional information through e-mail and/or hardcopy notification explaining the rejection of the submission. If issues are identified, submission will need to be resubmitted through the ESF website after the proper adjustments are made.

3 Forest Tenure and Permit Submissions

3.1 Background on Forest Tenure & Permit Submissions

The Ministry of Forests (MOF) and The Ministry of Sustainable Resource Management (MSRM) share responsibility for information submitted for forest tenures and permits. The Ministry of Forests is responsible for Forest Tenure & Permit administration whereas the Ministry of Sustainable Resource Management is responsible for registry of land and resource tenure and permitting information. The land and resource registry conducted by MSRM involves maintenance and identification of land and resource tenures in the province. This includes the location, status and holder of the tenure or permit. MSRM is responsible for registry of many resource and land tenure and permits including subsurface resources, forest resource, crown land, recreation and many more. The Ministry of Forests is responsible for the management of forest, road and range tenure and permits including compliance monitoring, fee collection, approvals and issuance of permits, and processing of Exhibit A's.

The information submitted through the electronic submission framework is shared between MOF and MSRM reducing the total number of submission required by these agencies. The MOF and MSRM are committed to reducing the number of submissions required of industry by sharing information between agencies and streamlining the submission process.

Forest licensees will make applications for cutting permits and road permits by submitting the application, including spatial information, electronically through ESF (see figure 2). The system will check whether the submission is valid (all of the required data is provided and in the correct format), and once it is validated, the submission will be processed by the MOF. If the submission is not valid, a report will be returned to the licensee outlining the problem. Licensees will be able to track the status of their application through the system.

Note: Appraisal information is not submitted through the ESF system. It is submitted separately through the E-commerce Appraisal System (ECAS). *http://www.for.gov.bc.ca/his/esd/access/ecas.htm*

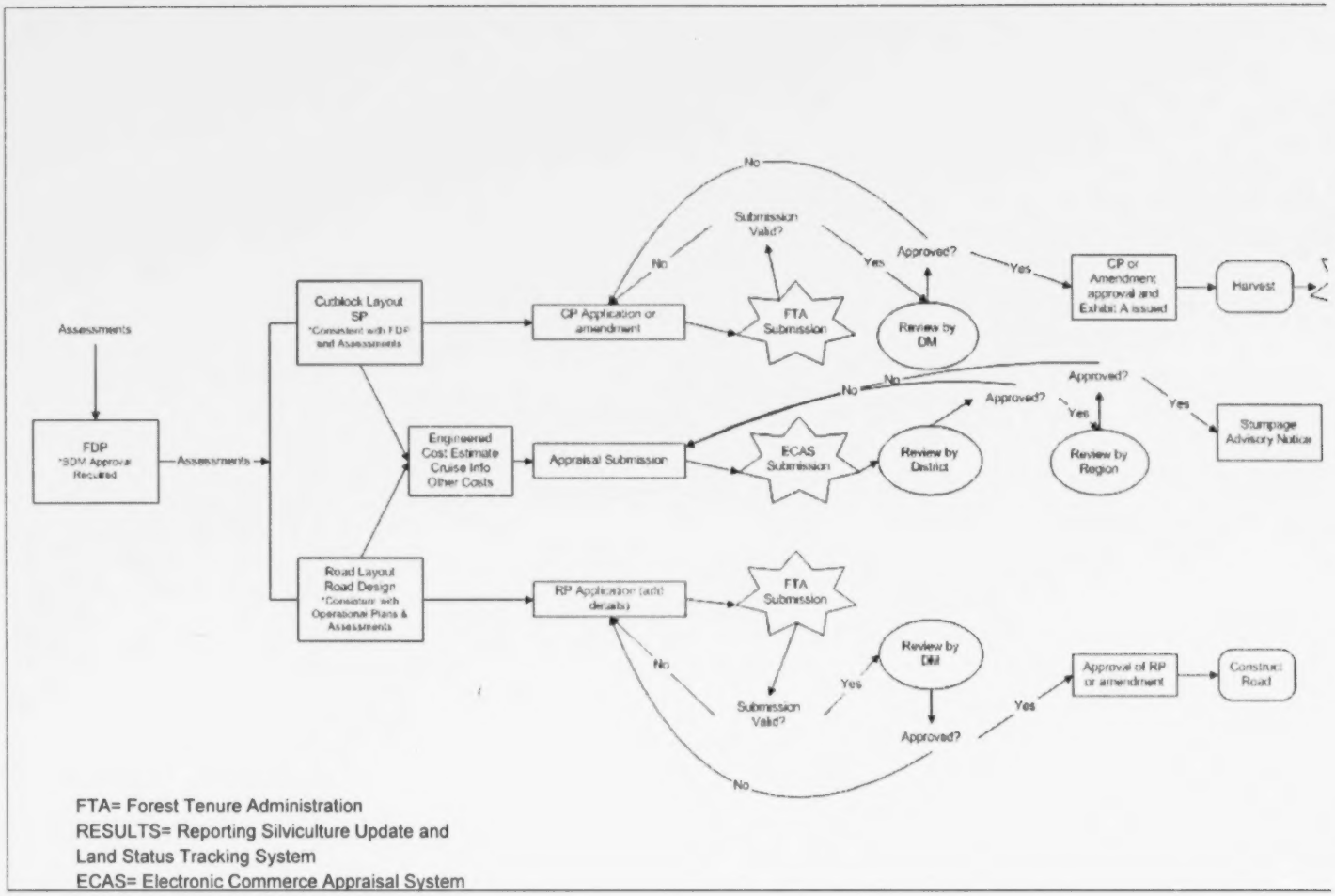


Figure 2 – Integration of electronic submission into the permit and tenure approval and obligation reporting for forest management i Columbia

This guide covers types of tenure and permitting submissions that will commonly be used by non-District staff (e.g., major and minor licensees and BCTS). Chart creation and amendment submissions will be made by the forest district and are not covered in this guide. The submission types that are covered in this guide are described below.

Submission Type	Examples	Details
New Cutting Permits/Cut Block and Amendments	Cutting Permit/Cut Block applications for: Forest Licence Woodlot Licence Tree Farm Licence Timber Sale Licence Timber Licence Community Forest Licence Timber Sale Licence-Multi Mark	This is the mechanism for getting authority to harvest through cutting permit approval by the district manager. (Forest Act Part 3 Sec 14, 22, 30, 35, 43.3, 45). Amendments to cutting permits will also be made using this submission type.
New Road Permit/Section Applications and Amendments	Road Permit/Section	This is the mechanism for getting authority to construct, modify, or maintain a road. (Forest Act Part 8 Sec. 115). Amendments to Road Permits will also be made using this submission type.
New Harvest Applications/Cut Block and Amendments (No Cutting Permit)	Licence to Cut Timber Sale Licence-Single Mark.	This is the mechanism for getting authority to harvest, cut, or salvage timber for tenures that do not provide for cutting permits. Amendments to these permits will also be made using these submission types. These submissions will generally be made by BCTS.
Timber Licence Elimination	Timber Licence	To be used by the Licensee to make annual submissions of license blocks harvested and eliminated from a Timber Licence.

3.2 General Submission Guidelines

Electronic submissions are made by uploading a submission document to the ESF website. An FTA submission document could contain more than 1 type of submission (for example, the same document could contain cutting permit applications for 2 different CP's as well as an application for a road permit amendment) provided the submissions are for the same Licensee, within the same forest district, and have the same contact person.

Any tool that can format an XML/GML document may be used to prepare the FTA document for submission. See Appendix A for a description of common tools available at this time.

3.3 General Content Requirements

There are a number of components that are common to all submissions made through FTA. Technical descriptions of these components and the required content, as well as a diagram of structure of the

submission document may be found in the *Electronic Submission Framework FTA Submission Guide Rev.7A*. The common components include:

Submission Header	Contains information that ensures that the submission is processed correctly by the ESF system, including information such as the version of FTA that is being used to create the submission. This information will be the same for all submissions.
Submission Metadata	Contact information, including email address and phone number, for the person making the submission. In the case of a consultant making a submission on behalf of a Licensee, this would be the Licensee contact information.
Submission content	This may include a name and description of the submission. This is optional, and would just be used for information purposes for the Licensee.
FTA Metadata	This is general information about the FTA submission and must include the forest district code, MOF client code, client location code (used to identify different divisions of a company), Licensee contact name, phone number and email address, and date the submission was created. The MOF client code and client location codes are assigned by the Ministry and can be found on any stumpage adjustment letter.

Each submission document may contain one or more new or amended submission items, of the same or different types. The submission can also be made to amend metadata content without including any submission items. Submission items include:

- Cutting Permit Applications and Amendments
- Road Permit Applications and Amendments
- Timber Licence Eliminations
- Harvest Applications without Cutting Permit

Specific requirements for submission items are described in the following sections.

3.4 Cutting Permit Applications

Cutting permit submissions will be made for all major tenure types where cutting permits provide the harvesting authority. Cutting permit application and amendment submissions include new cutting permits, as well as amendments to cutting permits or cut blocks within the cutting permit. Submissions can contain applications for 1 or more cutting permits. A cutting permit is made up of 1 or more cut blocks, with each cutblock comprised of a single or multi-part polygon.

Within the cutting permit submission, general information about the cutting permit must be provided, as well as information specific to each block within the permit. A complete list and technical description of the data requirements is provided in the *Electronic Submission Framework FTA Submission Guide Rev.7A. p. 20-22.*

General cutting permit information includes some mandatory and some optional fields. The following is a selection of fields with clarification on the content or explanation of when the fields must be filled in. Where code lists are referred to, the allowable codes are provided in the *Electronic Submission Framework FTA Submission Guide Rev.7A.*

Field	New requirement for Licensee?	Required when?	Details
Forest File ID number	Yes	Always	Enter the Licence number that applies to the cutting permit (e.g., A19000, TFL99, T0123). For private land within a woodlot or TFL this number is the timber mark.
File Type	Yes	For new tenures only	Enter the code that identifies the tenure type. See *Electronic Submission Framework FTA Submission Guide Rev. 7A. p. 36* for a list of codes. For example, A01 is the file type for a FL, and A02 is the file type for a TFL.
District Code	No	Always	Enter the 3 letter code for the district that the permit is in. A CP can only be within 1 district. See *http://www.for.gov.bc.ca/MoF/maps/regdis/regdis.htm* for complete list of codes.
Cascade Split Code	No	Always	E or W to indicate east or west side of the Cascade Mountains. Any area in the Coast forest region would be coded as W, and any area in the Northern or Southern Interior forest regions would be coded as E.
Application Purpose	No	Always	N or A to indicate new or amended CP submission.
Tenure Term	No	Optional	Enter tenure term in months. For a new CP this will be assigned by the ministry.
Cutting Permit ID	No	Always	This is the cutting permit number assigned by the Licensee as per FDP or FSP, and is entered as a number or alphanumeric (eg. 200, not CP200).
Provincial Forest Conflict Code	Yes	Always	Indicate if CP is outside, within, or partially within a provincial forest. This information can be found on Mapview.
Marking Method Code	Yes	Always	Select code for appropriate marking method. Refer to *Timber Marking and Transportation Regulation* to choose appropriate marking method.
Crown Granted Indicator	Yes	Always	True or false to indicate if the cutting permit contains private land in the form of a crown grant.
Catastrophic Indicator	Yes	Always	Must indicate if there was catastrophic damage to the stand (e.g., blowdown, fire, bark beetle), otherwise the default is endemic damage.
Legal Description	No	Always	This includes a description of the POC location (bearing and distance to an acceptable tie, such as a surveyed corner of a lot, or the confluence of named creeks). POT location is optional.
Extent of	Yes	Always	This is the geographic boundary of the CP. It is usually the same as the geographic boundary of the cutblocks, but it may be an external boundary around a number of blocks. Refer to Part 6 for an explanation of spatial data.

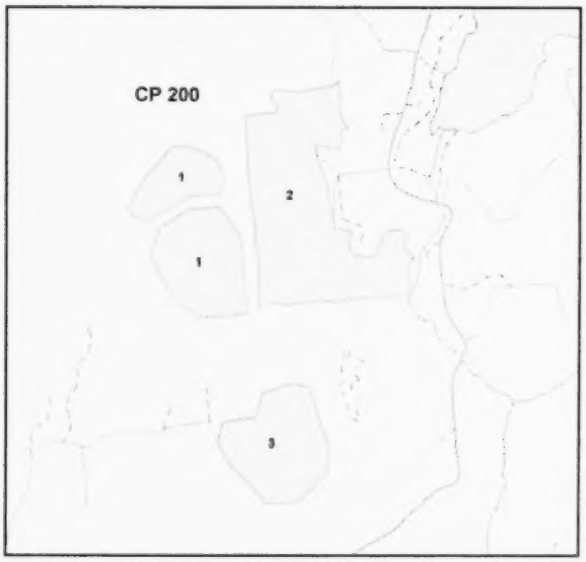
Information specific to cutblocks within the cutting permit must be included, unless the submission is made to amend only part of the general cutting permit information. Many cutblocks can be included within one CP submission; each block will have information specific to it. The following is a selection of cutblock-specific fields with clarification on the content or explanation of when the fields must be filled in:

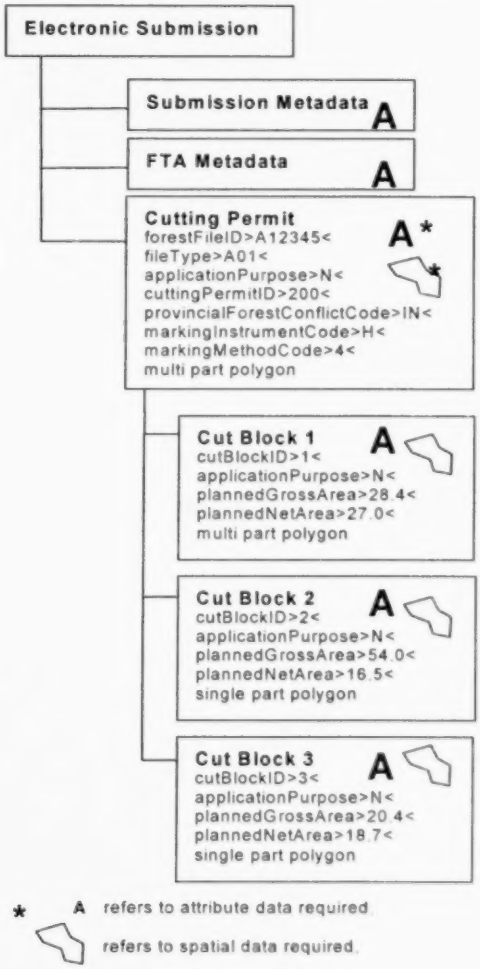
Field	New requirement for Licensee?	Required when?	Details
Spatial Metadata	Yes	Optional content, tag is required	This is information about the spatial data contained in the submission, such as the source of the data (e.g., field survey, TRIM data) and data capture method (e.g., GPS, digitizing). Codes are provided.
Cutblock ID	No	Always	This is the cut block number assigned by the licensee.
Application Purpose	No	Always	Specify new block or amended approved block.
Block Description	No	Optional	Written description, generally of block location for information purposes only.
Provincial Forest Conflict Code	Yes	Always	Indicate if CP is outside, within, or partially within a provincial forest. This information can be found as a layer in FC1 data.
Amendment Reason	Yes	Required for amendments	Codes are provided.
Cruise Volume	No	Optional	Only used for an amendment.
Managed by file	Yes	Only used for a Timber Licence where the TL is managed by a Tree Farm Licence, Wood Lot Licence, or Consolidated Timber Licence.	Indicate the file number of the tenure that the TL is managed by (Licence number, e.g., TFL99).
Managed by cutting permit	Yes	As in the case above	Identify the cutting permit number of the CP of the TFL, WL, or consolidated TL that is managing this TL.
Owned by file	Yes	Private land in a Tree Farm Licence or Wood Lot Licence to identify the private timber mark	This is only used when a private block land is to be harvested under cutting permit. The private mark would be entered as the file name.
Owned by cutting permit	Yes	As in the case above	If the private mark has no CP, leave blank.
Owned by block	Yes	As in the case above	If the private mark has no block, leave blank.
Legal description	No	Always	As with CP legal description, but specific to cut block.
Extent of	Yes	Always	This is the geographic boundary of the block. It can be a single polygon or a multi-part polygon (e.g., separate patches of the same block). Refer to Section 1 for an explanation of geographic data.

3.4.1 Cutting Permit Submission Examples

Example 1: New CP with 3 cut blocks. Cut block 1 is made up of 2 separate units, cut block 2 is group selection, and cut block 3 is a clearcut with reserves:

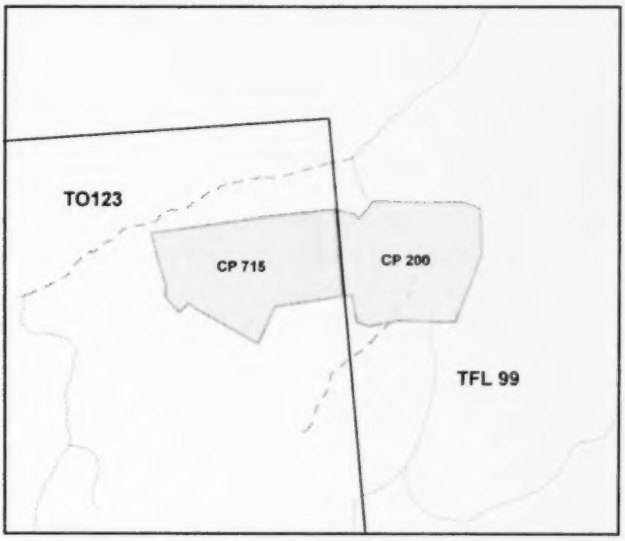
In this basic example, all general FTA submission information must be submitted (see Section 3.3), all cutting permit information must be submitted (see Section 3.4), and all cut block information for each of the three blocks must be submitted. The geographic boundaries for the cutting permit would generally be the same as for the cut blocks, with just the external boundaries for all three blocks being included in the document. The spatial data for cut block 1 includes both units, coded as a multi-part polygon (see Section 5 for details). Patch boundaries within the group selection block (block 2) would not be included. Block 2 has an area within it that is not part of the cutblock. In block 3, internal WTPs or other reserves would not be mapped, just the external block boundary is shown. In the case of WTPs on the outside of the block boundary (external WTPs), these may or may not be shown as part of the cut block area.

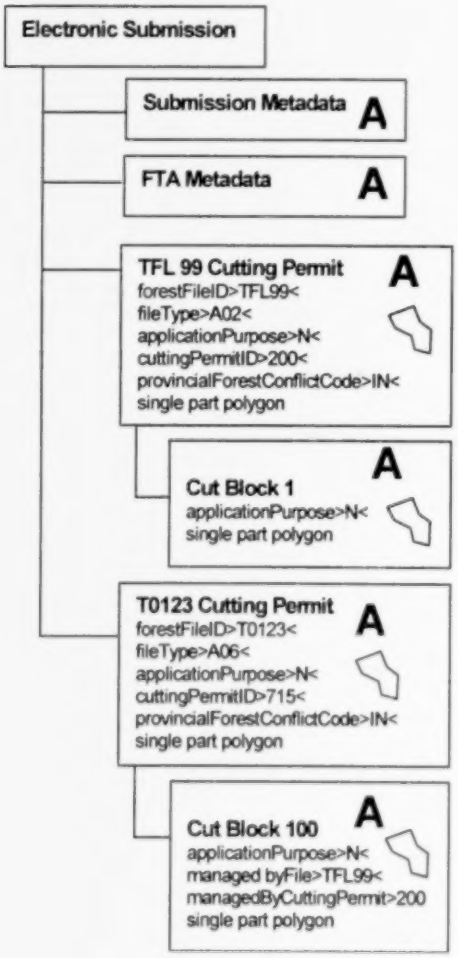




Example 2: New cut block that is partially within a TFL and partially within a TL:

In this case, the cut block must be submitted as two individual cut blocks under two different cutting permits. One FTA submission document would be made, containing 2 cutting permit items, with all applicable information. Each cutting permit would contain 1 block with all applicable information. For the TL block (CP 715 block 100), the "managed by file" field would identify the TFL number (99), and the "managed by cutting permit" field would identify the TFL CP number (200).

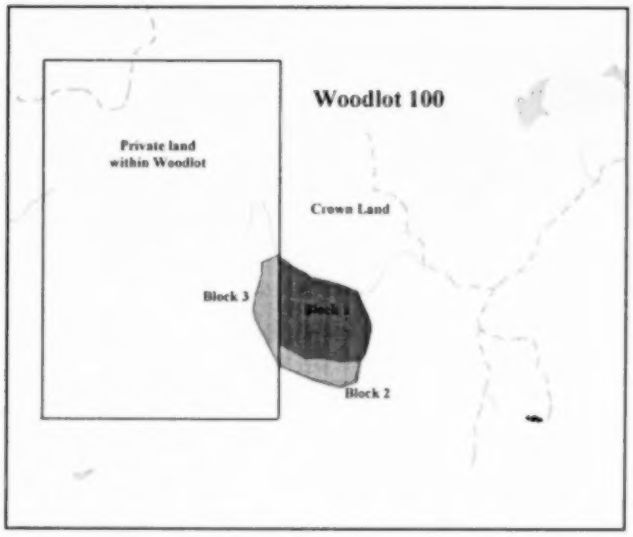


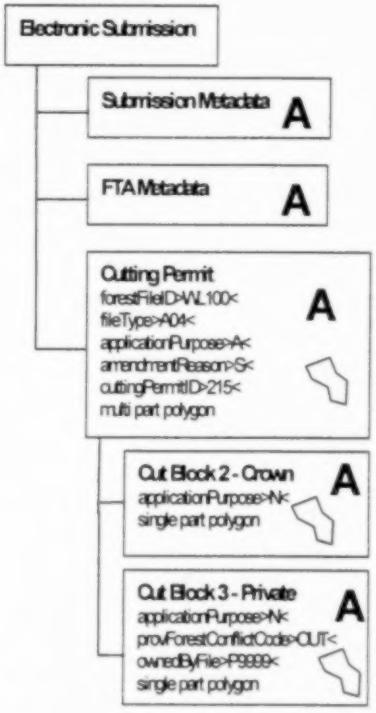


Example 3: Existing approved woodlot CP amended to add a cut block that is partially on crown land and partially on private land:

In this example, a cut block is being added to an approved cutting permit for a woodlot. However, the cut block is an area of blowdown that is partly within the crown land portion of the woodlot (Schedule A land), and also partly within the private land portion of the woodlot (Schedule B land). This example assumes that the woodlot agreement requires cutting permits on the private land. The cut block must be submitted as two individual cut blocks under one cutting permit. The approved CP is for the crown land, and the licensee is going to add a cut block for the private land portion of the area to be harvested.

One FTA submission document would be created, containing one cutting permit two cut blocks, with all applicable information. All general FTA submission information must be submitted (see Section 3.3), all cutting permit information must be submitted (see Section 3.4), but block information would only be included for the new cut blocks. The block area would be divided as per the ownership boundary. The application purpose for the CP would be "A" (amendment) and the application purpose for the blocks would be "N" (new). The "owned by file" field would indicate the private timber mark, and the "owned by cutting permit" and "owned by block" fields would be blank. The amendment reason could state something like "Cut block added to salvage an area of blowdown adjacent to the 500 Road". Blocks that are already approved should not be re-submitted unless they are also being amended (e.g., significant

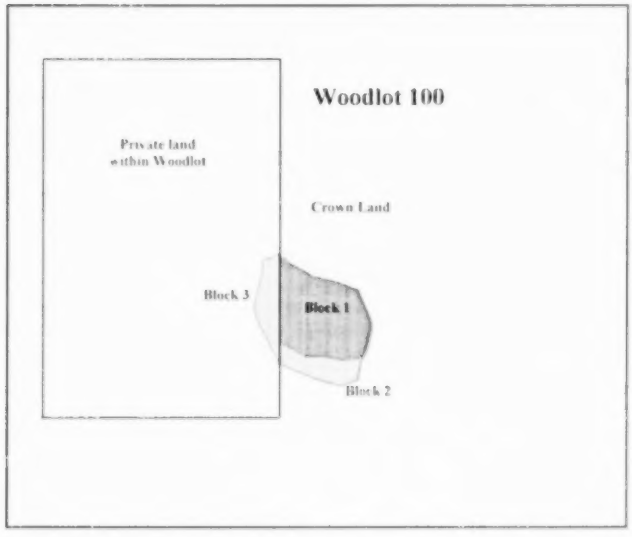


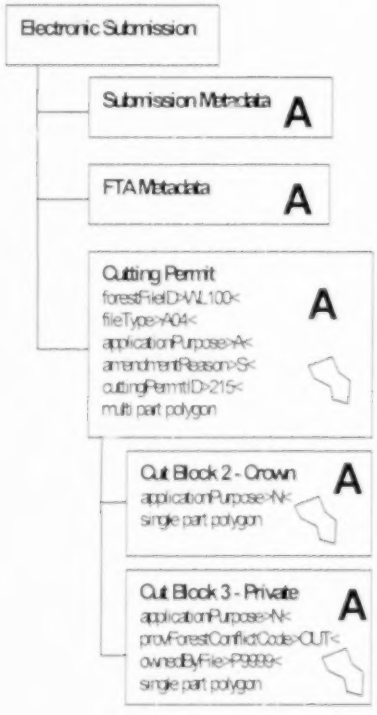


Example 3: Existing approved woodlot CP amended to add a cut block that is partially on crown land and partially on private land:

In this example, a cut block is being added to an approved cutting permit for a woodlot. However, the cut block is an area of blowdown that is partly within the crown land portion of the woodlot (Schedule A land), and also partly within the private land portion of the woodlot (Schedule B land). This example assumes that the woodlot agreement requires cutting permits on the private land. The cut block must be submitted as two individual cut blocks under one cutting permit. The approved CP is for the crown land, and the licensee is going to add a cut block for the private land portion of the area to be harvested.

One FTA submission document would be created, containing one cutting permit two cut blocks, with all applicable information. All general FTA submission information must be submitted (see Section 3.3), all cutting permit information must be submitted (see Section 3.4), but block information would only be included for the new cut blocks. The block area would be divided as per the ownership boundary. The application purpose for the CP would be "A" (amendment) and the application purpose for the blocks would be "N" (new). The "owned by file" field would indicate the private timber mark, and the "owned by cutting permit" and "owned by block" fields would be blank. The amendment reason could state something like "Cut block added to salvage an area of blowdown adjacent to the 500 Road". Blocks that are already approved should not be re-submitted unless they are also being amended (e.g., significant



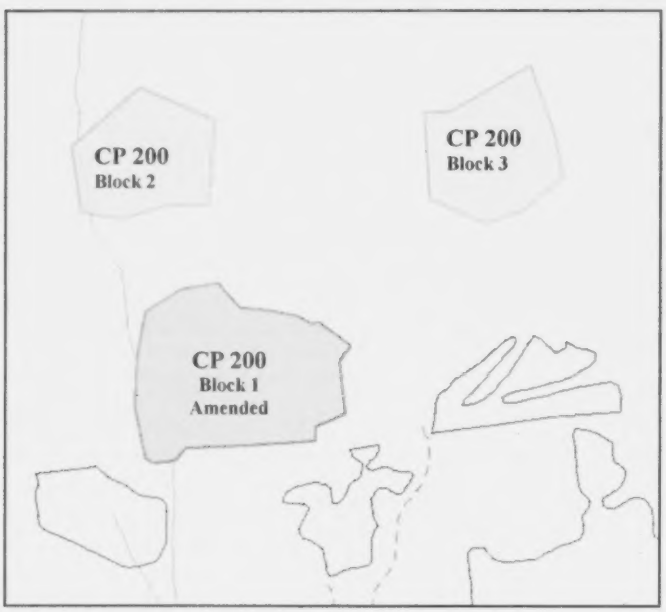


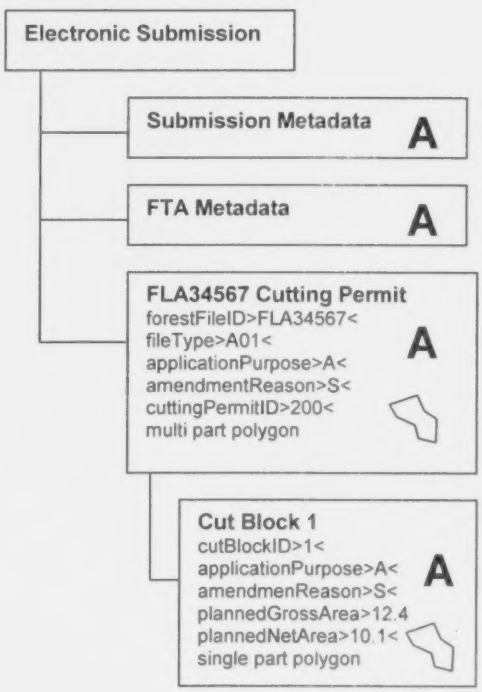
boundary change).

Example 4: Existing cut block amended to include a blowdown area:

A blowdown area adjacent to an approved cut block could be submitted as an amendment to the block, or as a new block. In this case, the blowdown occurred soon after harvest, so the licensee is adding the area to the existing cut block.

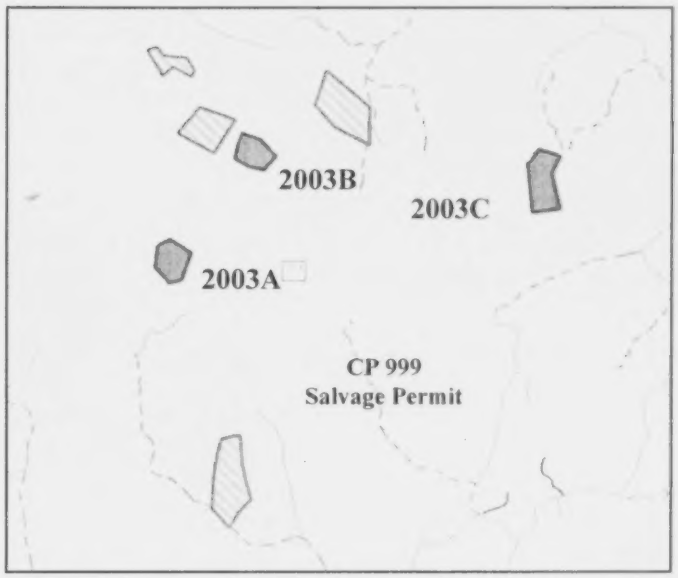
All general information must be submitted (see Section 3.3), all CP information must be submitted, including the spatial data for all other blocks in this permit (see Section 3.4), as well as all cut block information for the block that is being amended. The "amendment reason" field would specify "S" (salvage) and could state "1.1 ha of blowdown added to block". The "planned gross area" would include the entire area of the block, including the area already approved. The "cruise volume" field would be completed only if the area added to the block was cruised. Information for other blocks that are not being amended should not be submitted. Spatial data would include the entire external boundary of the block including the original and amended area.

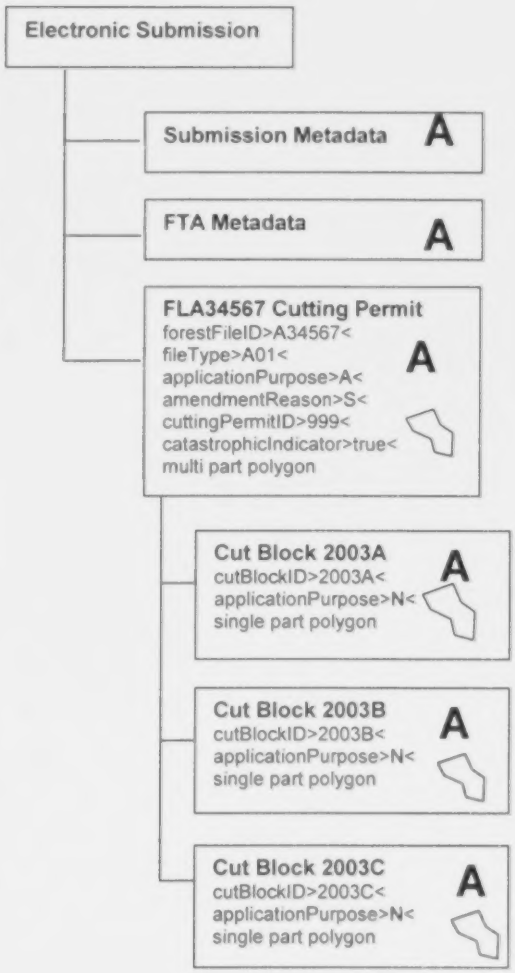




Example 5: Existing generic salvage permit amended to include cut blocks harvested within the last year:

In this situation, the cutting permit boundary includes all blocks harvested under the salvage permit, and the licensee would submit annually all of the new blocks that have been harvested. All general information must be included (see Section 3.3), and all cutting permit information must be included, including the spatial data for all previously approved cut blocks (see Section 3.4). Block information would be submitted for the cut blocks that were harvested in the previous year, and have not already been submitted. Blocks previously submitted should not be re-submitted unless they are also being amended. Exhibit A's are not issued for blocks harvested under a salvage permit, because these blocks have already been approved under a blanket Exhibit A.





3.5 Harvest Applications (no Cutting Permit)

Harvest applications without CP will be made for all tenure types where cutting permits do not provide the authority to harvest. Submissions must be made to obtain permission to harvest, cut, or salvage timber under a Christmas tree permit, licence to cut, log salvage permit, or single mark timber sale license. Licensees and BCTS will only use license to cut and single mark timber sale. Harvest application submissions include new applications as well as amendments to previously approved applications, or cut blocks within previously approved applications. General information about the harvest application must be provided, as well as information specific to each block within the application (where applicable). A complete list and technical description of the data requirements is provided in the *Electronic Submission Framework FTA Submission Guide Rev.7A. p. 23-25.*

General harvesting application information includes some mandatory and some optional fields. The following are a selection of fields with clarification on the content or explanation of when the fields must be filled in:

Field	New requirement for Licensee?	Required when?	Details
Forest File ID number	Yes	Optional	Enter the licence number of the tenure. If you do not know this number, contact your local forest district.
File Type	Yes	Required for new applications	Enter the code that identifies the tenure type. See *Electronic Submission Framework FTA Submission Guide Rev. 7A. p. 36* for a list of codes. For example, B02 is the file type for a Christmas tree permit, and B04, B05, or B06 is the code for a licence to cut.
Application Description	No	Optional	Written description of the reason for the application or amendment.
District Code	No	Always	Enter the 3 letter code for each district. See http://www.for.gov.bc.ca/MoF/maps/regdis/newregdis.htm for complete list of codes.
Cascade Split Code	No	Always	E or W to indicate east of west side of the Cascade Mountains. Any area in the Coast forest region would be coded as W, and any area in the Northern or Southern Interior forest regions would be coded as E.
Management Unit Type	No	Always	Code to indicate TFL, TSA, etc. for the type of management unit the tenure is within. See *Electronic Submission Framework FTA Submission Guide Rev. 7A. p. 38* for a complete list of codes.
Management unit ID	No	Always	Number to identify the management unit (e.g. TFL99).
Application Purpose	No	Always	N or A to indicate a new application, or an amendment to an existing application.
Tenure Term	Yes	Optional	For new CP, will be assigned by ministry.
Block ID	No	Required where tenure has more than 1spatially separate block.	Unique identifier for the block of the tenure (eg Block A of TL 1234). Not the same as a cutblock.
Purpose	Yes	Optional	Use special use codes or licence to cut codes. See *Electronic Submission Framework FTA Submission Guide Rev. 7A. p. 37*

Legal description	No	Always	This includes a description of the POC location (bearing and distance to an acceptable tie, such as a surveyed corner of a lot, or the confluence of named creeks). POT location is optional.
Extent of	Yes	Always	This is the geographic boundary of the harvest application. It can be a single polygon or a multi-part polygon (e.g., multiple cutblocks within the harvest application). Refer to Section 6 for an explanation of spatial data.

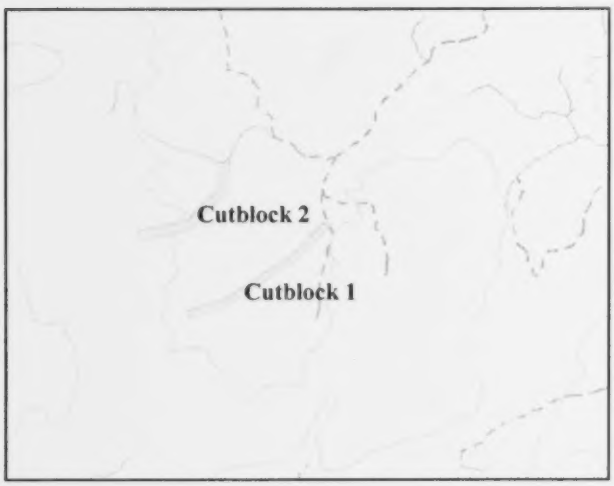
In cases where the harvest application has cutblocks, there is cutblock-specific information that must also be provided. If there are multiple cutblocks, this information is provided for each cutblock. Some of the information is required, and some is optional. The following is a selection of fields with clarification on the content and when the fields would be completed.

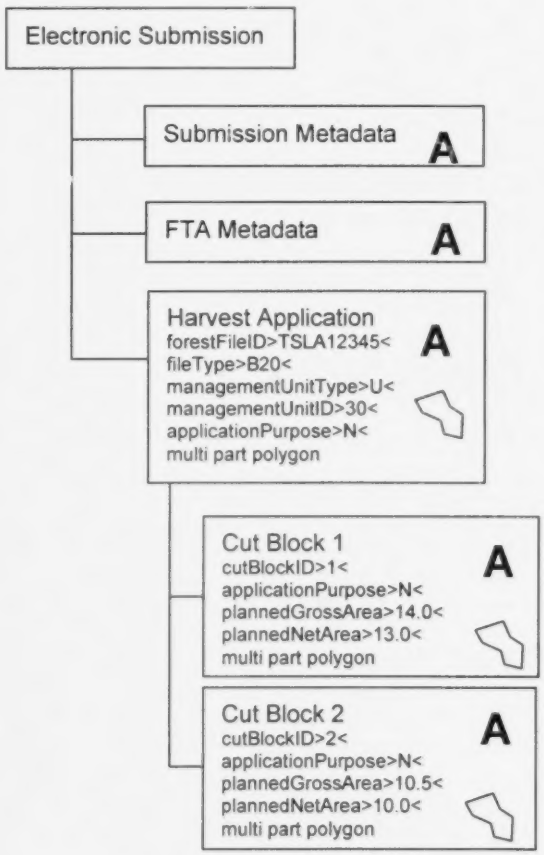
Field	**New requirement for Licensee?**	**Required when?**	**Details**
Cutblock ID	No	Always, if there are cutblocks	This is the number assigned to the cutblock, not to the geographic block of the tenure.
Application purpose	No	Always	Indicate new block (N) or amendment (A) to existing block.
Provincial Forest Conflict Code	Yes	Always	Indicate if CP is outside, within, or partially within a provincial forest. This information can be found as a layer in FC1 data.
Amendment Reason	Yes	Required for amendments	Codes are provided.
Cruise Volume	No	Optional	Only used for an amendment.
Legal description	No	Always	As with general harvest application legal description, but specific to cutblock.
Extent of	Yes	Always	This is the geographic boundary of the cutblock. It can be a single polygon or a multi-part polygon (e.g., separate patches of the same cutblock). Refer to Section 6 for an explanation of spatial data.

3.5.1 Harvest Application (no Cutting Permit) Submission Examples

Example 1: New single mark timber sale with 2 cut blocks:

In this example, all general FTA information would be included (see Section 3.3), all required harvest application information would be included (see Section 3.5), as well as all required information for each cut block. The geographic boundary of the harvest application would be the same as the boundaries of the 2 cut blocks (multi part polygon). Any internal reserves would not be mapped.





3.6 Road Permit Applications

Road permit submissions will be made for all roads and Forest Service Roads (FSRs). Submissions pertaining to FSRs can only be made by the Ministry of Forests, as they hold the tenure to all FSRs. FSR submissions are not covered in this guide. Road permit application submissions include new road permits, as well as amendments to existing road permits. General information about the road permit must be provided, as well as information specific to each road section within the permit. A complete list and technical description of the data requirements is provided in the *Electronic Submission Framework FTA Submission Guide Rev.7A. p. 26-28.*

A number of road permit applications or amendments can be made within one submission document. Each road permit submission can contain many road sections.

General road permit information includes some mandatory and some optional fields. The following is a selection of fields with clarification on the content or explanation of when the fields must be filled in:

Field	New requirement for Licensee?	Required when?	Details
Forest File ID number	Yes	Required for road permit amendments	This is the permit number that applies to the road permit.
File Type	Yes	Optional	This is a code that identifies the type of permit (B01 for Road Permit, B40 for FSR).
Application Description	No	Optional	Written description of the reason for the application or amendment.
District Code	No	Always	Enter the 3 letter code for each district. See *http://www.for.gov.bc.ca/MoF/maps/regdis/newregdis.htm* for complete list of codes.
Cascade Split Code	No	Always	E or W to indicate east of west side of the Cascade Mountains. Any area in the Coast forest region would be coded as W, and any area in the Northern or Southern Interior forest regions would be coded as E.
Management Unit Type	No	Always	Code to indicate TFL or TSA for the type of management unit the road permit is within.
Management unit ID	No	Always	Number to identify the management unit (e.g. TFL 99).
Application Purpose	No	Always	"N" or "A" to indicate a new road permit, or an amendment to an existing road permit.
Deemed Owner	Yes	Always "false"	True/false. This is an outdated field and should always be false.

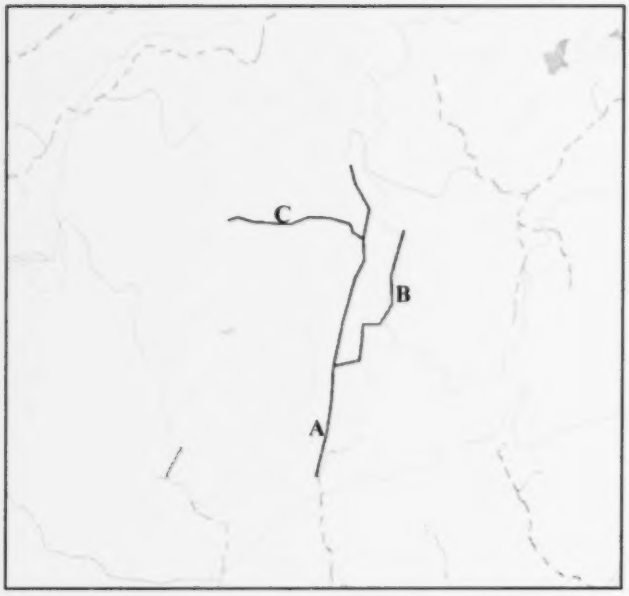
Information specific to road sections within the road permit must be included. Many road sections can be included within one road permit submission; each road section will have information specific to it. The following is a selection of road section-specific fields with clarification on the content or explanation of when the fields must be filled in:

Field	New requirement for Licensee?	Required when?	Details
Road Section ID	No	Always	Enter a number or letter to identify the road section.
Application Purpose	No	Always	Enter "N" to indicate a new road section or "A" if it is an amendment to a section already covered by this road permit. An existing road that is being added to the road permit would be a new road section whereas an extension of a section already covered by the road permit would be an amendment.
Provincial Forest Conflict Code	Yes	Always	Indicate if road section is outside, within, or partially within a provincial forest.
Within ALR	Yes	Always	True/False to indicate if road section crosses Agricultural Land Reserve land.
Amendment length	No	For all amendments	The positive or negative number of kilometers that will be added or subtracted (in the case of deactivation) due the amendment.
Amendment start station	Yes	For all amendments	Enter the station where the amendment starts (in kms) of the road being amended. For example, where road section R-100 is 2km long, and is being amended to add 1km to the end of existing R-100, you would enter "2".
Amendment end station	Yes	For all amendments	Enter the station where the amendment ends (in kms), of the road being amended. Using the above example, this would be "3".
Amendment type	New codes	Required for road permit amendments	Options are ADD (adding- for adding or extending a road section), REM (remove or deactivate), or REN (re-engineer or modify).
Road state	Yes	Optional	Choose from list of codes describing current state of road as proposed, established, or unknown.
Legal description	No	Always	This includes a description of the POC location for the road section (bearing and distance to an acceptable tie, such as a surveyed corner of a lot, or the confluence of named creeks) and at least one POT for the road section.
Centerline	Yes	Always	This is spatial data that describes the location of the road section centerline. The type of road section must also be specified (Add, Deactivate, Re-align). See Section 6 for an explanation of spatial data requirements. The *Electronic Submission Framework FTA Submission Guide Rev. 5. p. 10-11* also has details on spatial metadata and GML requirements.

3.6.1 Road Permit Submission Examples

Example 1: New road permit in a forest licence with one proposed mainline and 2 proposed sections.

In this example, all general FTA submission information must be submitted (see Section 3.3), all road permit information must be submitted (see Section 3.4), as well as all information for each road section within the road permit. A number of road sections can be submitted under one road permit application. The "road section ID" for the mainline would be "A", and the 2 block roads would be sections "B" and "C". The "application purpose" for all 3 sections would be "N" (new). The "provincial forest conflict code" would be "IN" if the road permit is entirely within the provincial forest. Fields that refer to "amendment" would not be filled in. The "road state" would be "P" (proposed). The "legal description" would be the bearing and distance of the road section POC to an acceptable tie point. The "center line of" field would be "A" (adding) for all 3 sections, and the spatial data that describes the road centerline for each section would also be included in this field.



Electronic Submission

Submission Metadata **A**

FTA Metadata **A**

Road Permit **A**
forestFileID>R01234<
fileType>B01<
managementUnitType>TSA<
managementUnitID>30<
applicationPurpose>N<
deemedOwnerInd>false<

Road Section A **A**
roadSectionID>A<
applicationPurpose>N<
provincialForestConflictCode>IN<
withinALRIND>false<
line string

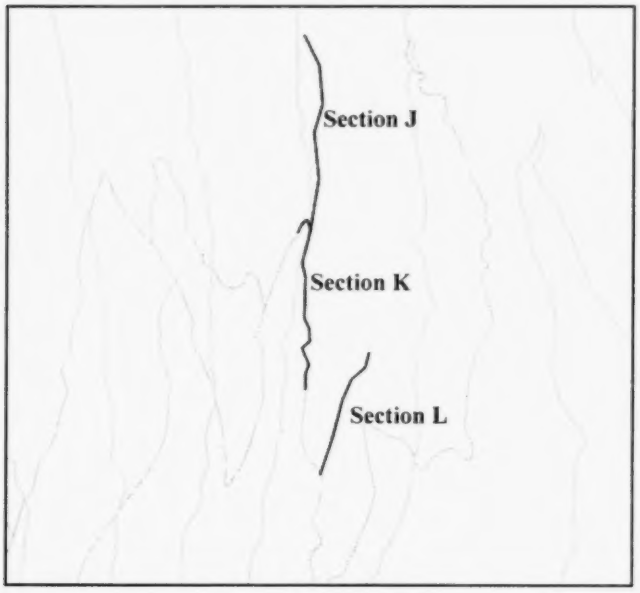
Road Section B **A**
roadSectionID>B<
applicationPurpose>N<
provincialForestConflictCode>IN<
withinALRIND>false<
iline string

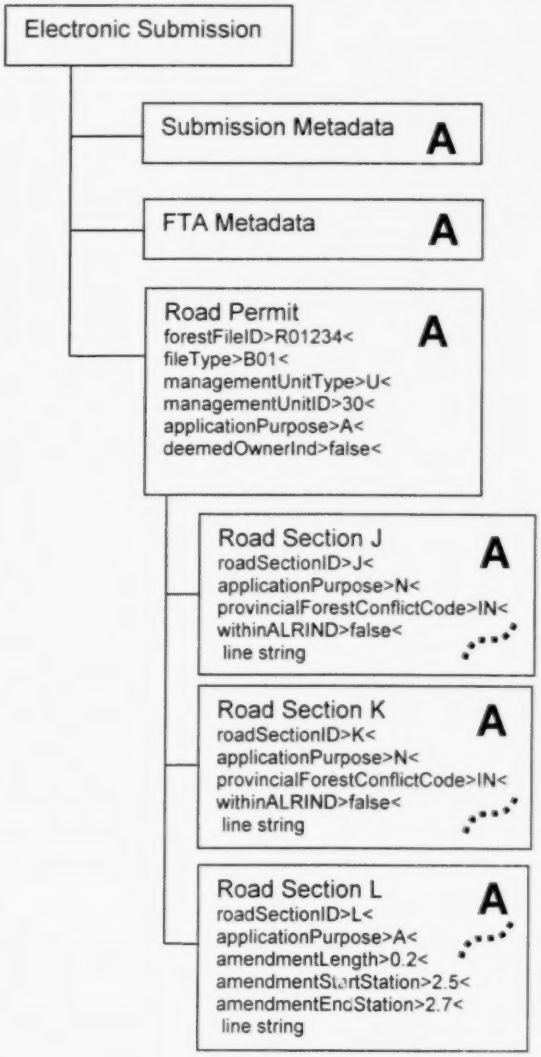
Road Section C **A**
roadSectionID>C<
applicationPurpose>N<
provincialForestConflictCode>IN<
withinALRIND>false<
line string

Example 2: Road permit amended to add a new (proposed) road section, add a section of an existing road that is not covered by a road permit, and extend an existing road already covered by the road permit:

In this example, all general FTA submission information must be submitted (see Section 3.3), all road permit information must be submitted (see Section 3.6), as well as all information for each road section within the road permit. The "application purpose" for the road permit would be "A" (amendment).

For the new road section (section J), the application purpose would be "N" (new). The legal description of the POC and POT for the section, as well as the road centerline data will be included. For the section of existing road that is being added to the permit (section K), the application purpose would be would be "N" (new). For the road section that is being extended (section L), the application purpose would be "A" (amendment). The amendment length would be 0.2 (km). The amendment start station would be "2.5" (station in kms of the existing road where the new extension starts). The amendment end station would be "2.7".



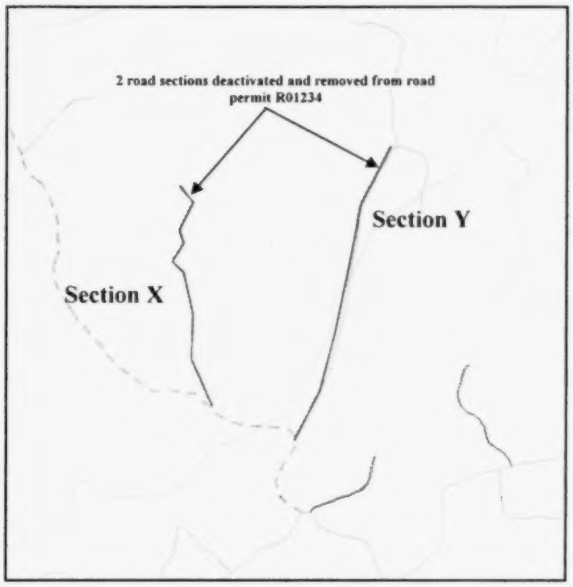


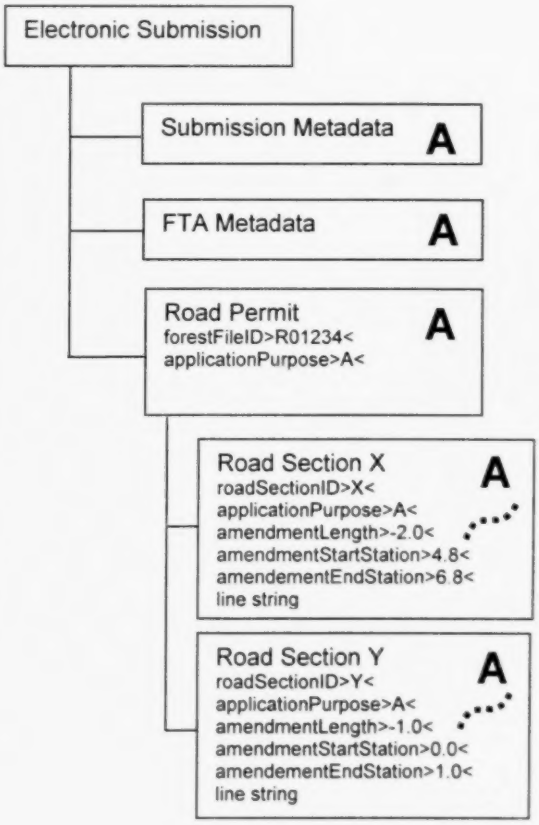
Example 3: Road permit amended to add a section of an existing FSR that requires modification in order to incorporate a junction with the proposed road section:

This cannot be submitted by a licensee until the Ministry of Forests has amended their road permit to remove the road section in question from the FSR. Once this has been done, follow the procedure outlined in example 2 for adding a section of existing road that is not covered by a road permit.

Example 4: Road permit is amended to deactivate 2 road sections:

In this situation, all general FTA submission information must be submitted (see Section 3.3), all road permit information must be submitted (see Section 3.6), as well as the road section information for the 2 road sections that are being deactivated and removed from the road permit. The amendment length would be a negative number to reflect the fact that these road sections are being removed from the road permit.





Example 5: Amended road permit that includes a right-of-way through private land:

Authorization for the right of way on private land is not obtained through the FTA process. The process outlined in the Forest Act (Section 120) would apply for the section of the road on private land, and the road permit would not apply to this road section. For the remaining sections of the road, the standard new road permit application process would apply.

3.7 Timber Licence Elimination

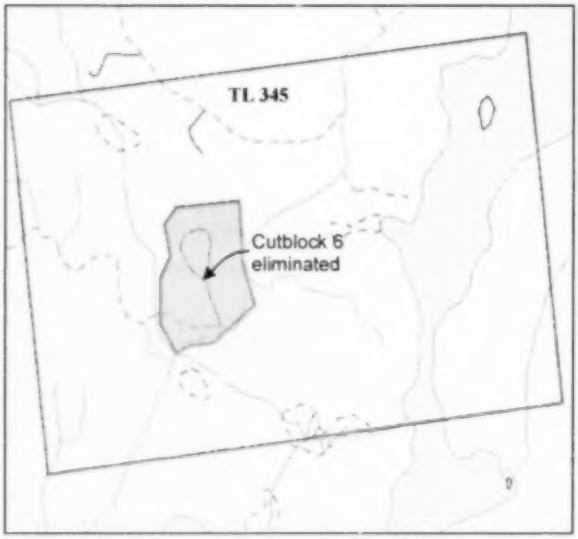
More than one timber licence elimination submission can be made within an FTA document. Information about the timber licence and location of the area to be eliminated must be submitted. A complete list and technical description of the data requirements is provided in the *Electronic Submission Framework FTA Submission Guide Rev.7A. p. 33-34.*

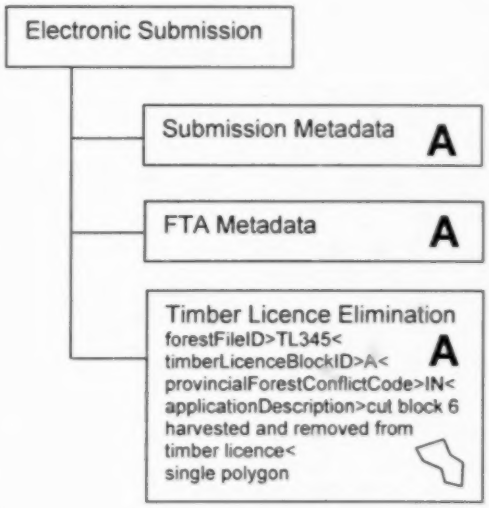
All fields must be completed for a timber licence elimination submission. The following are a selection of fields with clarification on the content or explanation of when the fields must be filled in:

Field	New requirement for Licensee?	Required when?	Details
Forest File ID number	Yes	Always	This is the timber licence number. It is always required.
Timber Licence Block ID	No	Always	This is the timber licence block number that the area being submitted falls within.
Provincial Forest Conflict Code	Yes	Always	Indicate if road section is outside, within, or partially within a provincial forest. This information can be found as a layer in FC1 data.
Application description	No	Always	Written description of reason for the submission
District Code-	No	Always	3 letter code for each district. See http://www.for.gov.bc.ca/MoF/maps/regdis/newregdis.htm for complete list of codes
Extent of	Yes	Always	This is the geographic boundary of the area that is being submitted for elimination. Spatial metadata is also required. Refer to section 5 as for an explanation of geographic data. The *Electronic Submission Framework FTA Submission Guide Rev.7A. p. 12-13 /* also has details on spatial metadata and GML requirements.

3.7.1 Timber Licence Elimination Example

Example 1: One cut block harvested from timber licence
The licensee may request elimination of harvested timber licence area that has achieved free to grow status (Amendment January 14th, 2004).
All general FTA submission information must be submitted (see Section 3.3), and all timber licence elimination information must be submitted (see Section 3.7). The forest file ID number refers to the timber licence number, and must be included. The block ID refers to the timber licence block from which the cut block area was harvested, not to a cut block number that was given to the harvested area. The





geographic boundary that is included would show the actual harvested cut block.

4 Automated land and resource tenure checks through the web

Licensees are able to report on land status and review land and resource tenure clearances for the areas for which they are submitting applications for permits or licences. Reporting on the land status prior to submitting a forest tenure or permit request will reduce the likelihood of delays in processing applications and reduce the number of rejected requests resulting from conflicts between land and resource tenures. Licensees are expected to perform an automated licence status check prior to making formal submissions to MoF for tenure or permits, but application processing will still proceed if a status check is not done.

Status checks can easily be completed across the internet using permit and tenure electronic submission documents (XML/GML) and the Tenure Map Service (TMS) provided by Ministry of Forests and Ministry of Sustainable Resource Management.

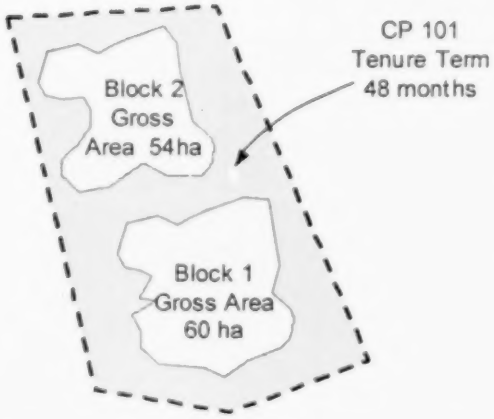
5 Details on the formatting of the submission

Overview of the Submission Format

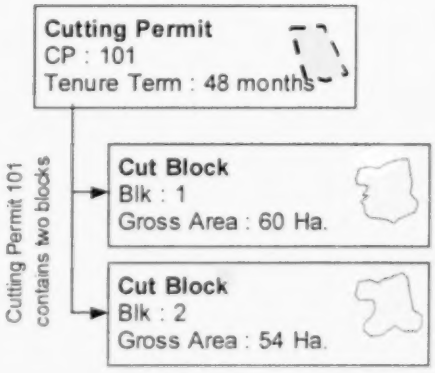
The format of a submission document is non-proprietary in nature and allows both the spatial and attribute information to be integrated into a single document. In the past the documents submitted electronically to government separate the spatial data and the non-spatial data into different related files. The structure of the separate spatial and attributes files did not show the relationships or hierarchies between features such as the cut blocks that collectively formed a cutting permit.

The new submission document format and structure requires that attributes and spatial information are integrated and there is very little room for errors or interpretation in relating the spatial and the attribute information. The format is structured to contain information about individual features (such as a cut block and attributes) in addition to information about how the features relate to one another. The description of the structure of the data and the relationships between features are referred to as document "schemas". A guide to the structures and content of the submissions can be found:
http://www.for.gov.bc.ca/his/esf/assets/fta/

Submission Information Overview



Submission Document Structure



Cutting Permit 101 contains 2 cut blocks (blocks 1 or 2) with different areas. The cut blocks are both contained within the cutting permit structure and formatted to show that relationship.

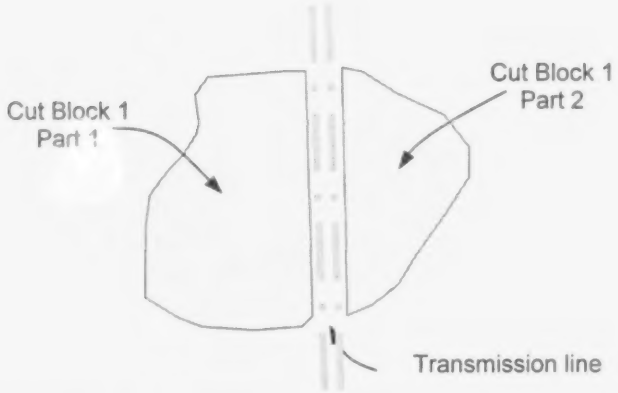
The overall submission formatting standards utilize XML (extensible mark-up language) in order to provide a simple way to structure information. The standards for XML are developed by ***World Wide Web Consortium*** (*http://www.w3.org/*) which sets all standards for the internet, internet data formats and more. Spatial information stored in the submission document is an extension of standard XML called GML (geography mark-up language). The standards for capture of spatial features (GML) in XML are defined by the ***Open GIS Consortium*** (*http://www.opengis.org/*) which is an international spatial standards development consortium.

> Further information technical information on XML can be found at *http://www.w3.org/XML/*
>
> Further technical information on GML can be found at *http://www.opengis.net/gml/02-069/GML2-12.html*

Properly Formatting Spatial Data in Submissions

One of the more difficult issues to deal with when preparing a submission document is complete knowledge of the spatial data and how it should be structured for the submission. Traditionally we are taught to think of spatial information in terms of polygons, lines and points. Polygons, lines, and points are still key to the structure of the spatial information, but for electronic submissions, these simple geometries must be extended to include multiple parts and internal holes.

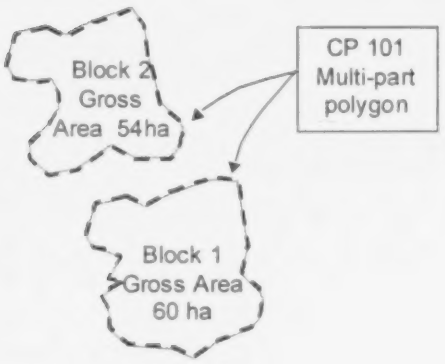
Multi-part geometry allows for a single feature (such as a cut block), represented by two spatially isolated polygons, to be represented in GML as a multi-part polygon. It is extremely important to use multi-part geometries when trying to represent a single feature when there are gaps between some of the feature parts. Multi-part polygons in GML ***are not*** the same in structure as utilizing two polygons to represent the same feature. Attributes are stored only once in a submission for a feature being represented by a multi-part geometry (i.e. a single cut block divided by a transmission line). Representing a feature with two polygons, such as one cut block described spatially by two polygons with duplicate attributes, within a submission file will cause your submission application to fail (see diagram below).



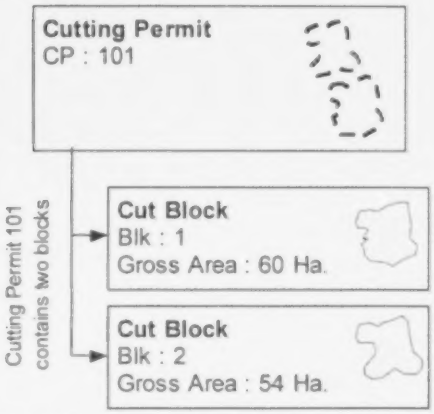
Single cut block (CP 101 Block 1) represented by a multi-part polygon.

For forest tenures and permits, a common usage of multi-part polygons will be in representing a cutting permit boundary where the cutting permit boundary is consistent with the cut block boundaries that are part of the submission. For the 2 cut blocks represented by single polygons, the cutting permit would be represented by a single multi-part polygon (see diagram below).

Submission Information Overview

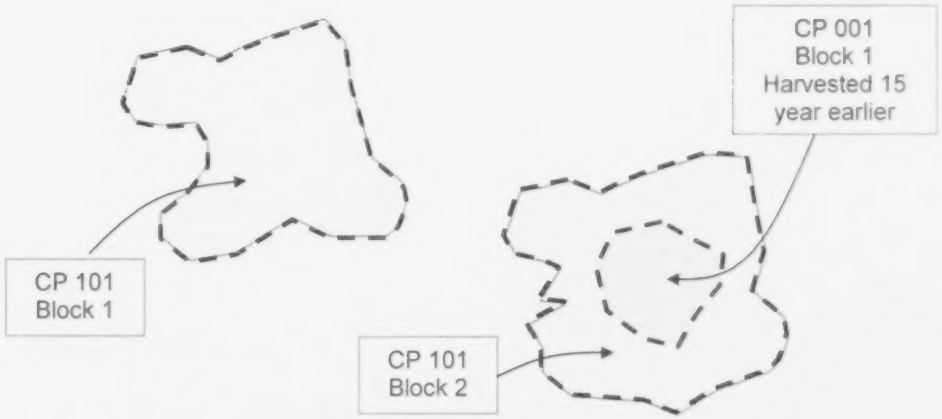


Submission Document Structure



The cutting permit boundary is a multi-part polygon that covers the same geographical area as its' component cut blocks. The cutting permit boundary must be represented as a multi-part polygon and not 2 separate polygons to be valid.

In cases where an internal hole within a polygon is required, such as a new cutting permit that completely surrounds a previously approved harvested area, the spatial data must utilize internal rings or polygons to encode the "donut holes" in the spatial information (see diagram below). It is important to note that internal reserves are ***not excluded*** from the polygon boundaries of cut blocks and/or cutting permits. There is no requirement to submit spatial information about internal reserves with submissions.



The cutting permit and block boundary in CP 101, block 1 submission must include an internal donut hole in both the cutting permit and the cut block geometry. The area harvested 15 years earlier would not have any associated information.

When dealing with spatial projections, three general types are supported: Geographic (Latitude/Longitude), Universal Transverse Mercator (zone 7,8,9,10,11 in metres), and Albers Equal Area (BC Standards). When supplying e-submission documents, the project information must be defined for each spatial object. For information on encoding GML and examples for forest and Tenure submissions,

refer to the FTA Submission Guide or RESULTS Submission Guides available at *http://www.for.gov.bc.ca/his/esf/*.

Common Mistakes in Formatting Documents

There are some key things to be aware of when formatting submissions:

1. Do not think of the submission document as a database. The structures to the submission can be seen more as a document with structure and content much like a book with chapters, sections, and paragraphs rather than tables of information. The "schema" defines the structure.
2. Do not overlook the importance of the spatial information within the submission. It is critical for a properly formatted document to include the properly formatted spatial information.
3. CAD systems do not create the spatial data structures required for e-submission. Data conversion routines must manipulate CAD to create the correct structure.
4. Optional attributes that have no information supplied within the submission should not have XML/GML tags.

6 What to do next

The submission of forest tenure and permitting information documents through the Electronic Submission Framework provides an opportunity to streamline applications for cutting permit and tenure. Critical to the success of any e-submission is an understanding of the general process of submitting information electronically. Following this, it is recommended that any individual or group determines and develops an approach to managing and preparing electronic submissions which could include the use of service providers or the implementation of a system to directly extract submissions for an existing information management system. If you are unsure on how to prepare, ask for help. There are many groups and service providers that are gearing up to support e-submissions.

Appendix A. Tools for preparing submissions

There are many tools and approaches to managing the information for e-submission to the Ministry of Forests and Ministry of Sustainable Resource Management. One key feature of the e-submissions is that the submission format is not specific to any particular software application. The format standards are internationally developed standards and are supported by many applications spatial and non-spatial applications. Below is a general description of information management product groups for managing land and resource information.

Product Group	Description
Computer Aided Mapping/Design Applications (CAM/CAD)	These applications support cartographic design and development, but do not provide direct linkages between spatial elements and their attributes. These applications typically do not include support for spatial topology, projections, and attribute integration.
Geographical Information Systems (GIS)	Geographical information systems focus on managing and analyzing spatial information and provide a mechanism to relate spatial and attribute information directly. They help manage spatial topology, projections and integrate attributes.
Non-Spatial Forest Management Systems	There are many systems in use across the province to manage attributes relating to inventories, surveys or appraisals that do not directly manage or integrate spatial information into the product. In many cases spatial data is managed in a separate application such as a CAM/CAD or no spatial information is captured.
Integrated Forest Management Systems	Integrated forest management systems manage both the attribute and spatial information relating to forest applications and support the direct editing of e-submission documents.
Data Conversion System	These tools are often referred to as data transformation tools and convert data from one format and structure to another.
e-Submission Document Management Tools	These tools support direct editing of e-submission documents and focus directly on editing the content of an e-submission document.
Development Libraries and utilities	One option for supporting GML /XML submissions is through the development of custom applications designed to support XML/GML directly. To support this development many commercial and non-commercial development libraries are available.

Computer Aided Mapping/Design Applications (CAM/CAD)

Many groups utilizing CAM/CAD packages for mapping often use database, spreadsheets or documents to track non-spatial information. These non-spatial management systems could be forest management systems or custom solutions for management of attributes. Utilizing CAD/CAM packages for electronic submission will require the use of other applications to integrate and structure the spatial and attribute data into the necessary formats such as extract, load and transform tools or e-Submission Document Management Tools.

There are many key issues that will be faced in this option for submitting e-Submissions. First, CAD/CAM packages do not directly support spatial topology (see appendix B for definitions of topology) or often utilize different, often complex, data structures to represent spatial data that is not easily integrated with attribute information. CAD packages do not support mapping projections and often utilize arbitrary coordinate systems for mapping that do not directly relate to real world coordinates. Data from CAD/CAM software and formats can be transformed into correctly formatted GML, but users may experience translation problems that require manual editing and fixes. For transformation of CAD/CAM data to work more smoothly, the structure of the CAD data and data creation processes must be based on extremely good standards that are applied consistently.

Geographical Information Systems (GIS)

Licensees utilizing geographical information systems for mapping often use custom or commercial forest management systems to manage complex attributes. Often attributes and spatial information are tightly integrated and relating spatial data to attribute information is not a difficult exercise. Some commercial GIS packages may support export to GML, but currently GML support is evolving and requires some custom development to create properly formatted GML.

Although some GIS tools generate GML, they often do not provide support for structuring the spatial and attribute information in a structure to meet the e-Submission standards. Use of GIS tools will often require the use of secondary applications or customizations to correctly format an electronic submission. This can be gained through the use of extract, load and transform tools or e-Submission Document Management Tools.

Non-Spatial Forest Management Systems

Non-spatial forest management systems provide support for managing information that is necessary for submission to government. Such systems manage survey information, silviculture activities and related details, but do not directly support mapping of spatial information. Some systems do provide linkages by linking fields to spatial data stored in a GIS or CAD/CAM, but require user intervention to manage the relationship between the spatial and attribute systems.

For electronic submissions, the use of extract, load and transform tools or e-Submission document management tools are essential to creating properly formatted submissions. In some cases direct export of attribute information from the non-spatial forest management systems to XML is anticipated to be available. Integration of the spatial and attribute information and creation and management of spatial data is still anticipated to occur through external applications. In some cases, customization of the export utility may be required to meet the Ministry of Forest standard codes for particular client specific customizations/implementations of the forest management system. For information particular to your software product, contact your forest management system provider.

Integrated Forest Management Systems

Integrated forest management systems are anticipated to support direct export of e-submission documents from the application. The tight management of information and control of business processes and the strong association between spatial and attribute information allows for easy export of information to e-submission format. In some cases, customization of the export utility may be required to meet the Ministry of Forest standard codes for particular client specific customizations/implementations of the forest management system. For information particular to your software product, contact your integrated forest management system provider.

Extract, Transform and Load Applications (ETL)

ETL applications provide a generic framework as well as tools to allow for data translation routines to be developed and executed. These tools represent a set of core technologies for transforming attribute and spatial data and require specialized training and expertise to develop transformation routines. Currently, the Ministry of Forests is providing free access to a common ETL tool and training (see the ESF website for details on accessing the Feature Manipulation Engine FME at *http://www.for.gov.bc.ca/his/esd/*).

ETL tools function most effectively for organizations with very structured input data sources or locations that have dedicated staff to train and utilize the transformation tool.

e-Submission Document Management Tools

As e-submissions are evolving, tools specifically designed to create and manage e-submission documents are becoming available. These tools focus on the business process of creating and editing spatial and attribute information for e-submission. Current systems available can act as stand alone applications capable of creating submission without any GIS, CAD/CAM or forest management system or integrate with existing commercial and non-commercial systems. These tools provide the e-Submission structures and formats without needing to understand the details of standards or technologies.

Development Libraries and Utilities

A final option for creation of e-submission documents is the use of custom applications that provide specialized conversion or editing capabilities and/or integrate directly with a Licensee's existing mapping and information management systems. There are many different sources for programming libraries for many development tools and in many cases, modern development environments provide direct support for XML. Libraries for working with spatial data and GML are available from most GIS vendors as well as open source libraries available on the internet. Developing custom solutions utilizing development libraries requires a high degree of technical expertise and would likely be undertaken in very specific cases.

Selection of the Appropriate Tool

Selecting the appropriate approach to creating submissions can be overwhelming. Outlined below are some common situations for forest management mapping and information management and suitable approaches for preparing submissions.

No Mapping or Data Management Infrastructure

Where an organization has no existing mapping or data management infrastructure and has typically contracted the development of cutting permit, road permit and silviculture mapping and entry of forms, the most logical approach to preparing and submitting e-submission is through a data service provider. Service providers are beginning to offer a wide range of services for e-submissions to help licensees prepare and submit tenure and silviculture information to the Ministry of Forests.

CAD Mapping without Linked Attribute Information

Where an organization utilizes a CAD tool for the creation of mapping information, but does not utilize a database system or application to manage attribute information the licensee could use a service provider or an application to prepare submissions. The service provider option is best suited when there are a small number of submissions to be made an/or the licensee does not wish to spend the time and effort learning new technology. If a licensee prefers to control the creation or wishes to utilize internal resources of the submissions, the best option is to use an e-Submission Document Management Tool.

Inconsistently Managed GIS or CAD Mapping and Attributes

Where an organization's data is found in various systems with both spatial data and attribute information not following a consistently applied standard, the best approach to create submissions will be to utilize an e-Submission Document Management Tool. This approach is more likely to make the process of developing submissions easier as the tools provide the functionality necessary to correctly format the submission without depending on correctly formatted data. Other alternatives rely on very specific format and structure or a great deal of technical expertise to accurately create the submission document.

Well Managed GIS or CAD Mapping and Attributes

In instances where consistent standards have been utilized in creating spatial and attribute data and the relationships between attribute and spatial are well established, various approaches exist to correctly creating submission documents. Firstly, an organization could utilize a Data Conversion Tool and create scripts to extract information from the data stores and convert it into the submission format. This approach requires expertise in the development of translation scripts and use of somewhat complicated data conversion tools, but allows for easy batch processing of submissions.

Use of non-spatial Forest Management Systems

In cases where organizations have systems in place to manage attribute information, but use various approaches to manage spatial data, there are two main approaches. If the spatial data and the attribute data are managed consistently and relationships between spatial data and attributes are well established, data conversion tools may prove useful. In cases where the linkages between spatial and attribute information is not well established and standard data management approaches are not followed, an e-Submission Document Management Tool is a likely solution. This approach will allow for submissions to be quality assured and provide easy methods to visualize and review the submission prior to being submitted.

Integrated Forest Management Systems

In instances where an organization utilizes an integrated forest management system the best approach to dealing with e-submissions is to talk to your system provider to determine if they are supporting e-submissions directly from within the integrated system. If your provider does not have support or it is a system developed in-house, it may be worthwhile exploring the development of custom applications that

create the submissions directly and allow for quality assurance and review of the submission. In this situation where technical resources are available, the use of a data conversion tool may be a suitable approach.

Key factors in selecting a e-submission Approach

1. How well is the data managed? Poorly managed data makes batch processing, data conversion and the development of custom scripts difficult. Don't assume that if you have a database system in-place that your information is well managed, information management also relies on how a system is used and implemented.
2. What technical resources and skills does an organization have to allocate to the preparation of e-submissions? Data conversion and scripting requires technical resources to maintain and manage. This simplest approach to managing technical resources is to utilize a qualified service provider. The more technically challenging approach is development and maintenance of data transformation scripts.
3. How many different systems do you use to manage information that you will be submitting? If you utilize many different systems to manage information that will be submitted, the solution you select should work for all the types of submissions you will be making.
4. Do you already have a system that directly supports e-submission? Many information management systems utilized in British Columbia will have e-submission support. It is worth checking with your product vendor to determine what submissions they support.
5. What features will make your life easier when creating submissions? The selection of one approach over another is not trivial and it is worth investigating the options out there. Talk to product vendors and service providers to fully understand what will work best for your situation.

Appendix B. Formatting spatial objects

Key to the electronic submission framework is the inclusion of spatial data. To ensure submissions are accepted, spatial information must be formatted correctly and topologically correct. Topology refers to the structure and rules that must be applied to have valid geometric objects that can be used in analysis.

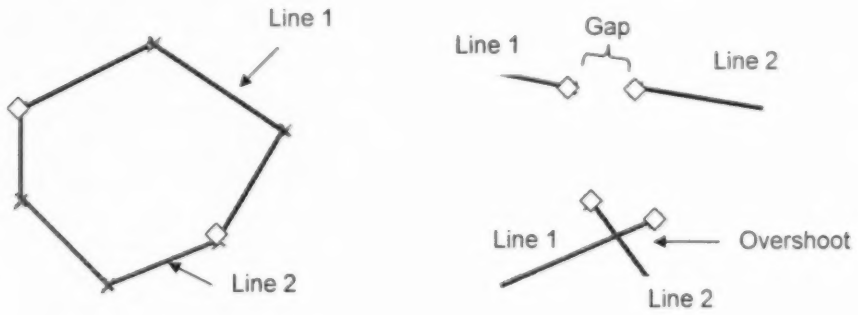
Basic structures for geometry include:

- Polygons
- Lines
- Points

Polygon Topology

A polygon is a closed shape that has a starting point equal to its' end point and is made up of a minimum of three points or vertices.

A polygon start and end point must be of the exact same coordinate for the polygon to be considered closed. In some CAD systems polygons can be represented using lines. When lines are used to represent polygons the start and end points of each line forming the polygon must have start and end point coordinates that match exactly. Lines forming the polygon cannot overlap and the point of intersection must be where the end and start points meet.



To ensure that end points and start points exactly match with CAD data requires the use of third party software. It is strongly recommended that data being converted from DGN to GML be cleaned using a tool such as MAPS 3D prior to converting to GML.

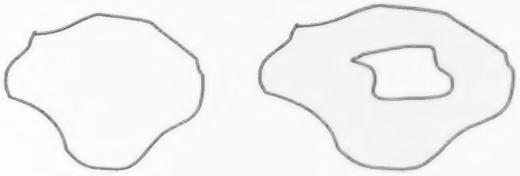
For polygons, it is common approach to ensure that the order of vertices flows clockwise. The standard approach ensures that the inside of the polygon is always on the right side of a line going from the start of

the line to the end. This is often referred to as the "right-hand-rule" and helps identify the inside and outside of the polygon. This rule should be applied to polygon holes as well.

Clockwise direction

Does not meet right-hand-rule

Polygon holes are used to identify internal donut holes in a polygon.



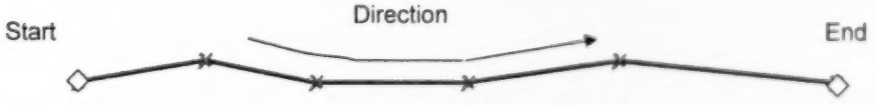
Polygon

Polygon with donut hole

When properly formatting GML for e-submission, polygon topology is critical to properly represent a spatial feature. GML uses linear rings to represent internal polygon holes as well as outer boundaries of a polygon.

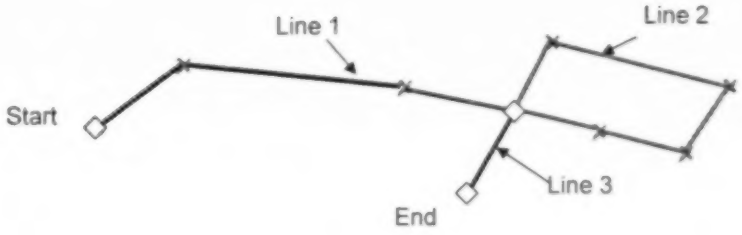
Linear Topology

Lines are fairly simple structures. These consist of a starting point and at a minimum an end point. Direction of a line is dictated by the location of starting and end points.



When building information that requires direction, ensure that lines are formatted correctly. Lines must not intersect themselves in all submissions.

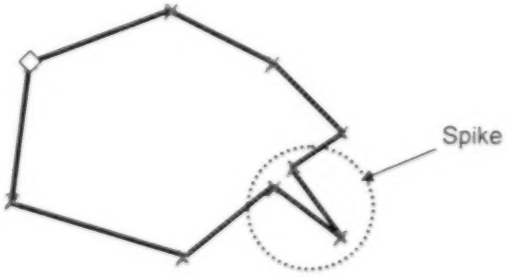
When a line intersects itself it likely identifies that two separate lines are required.



Common Topology Issues

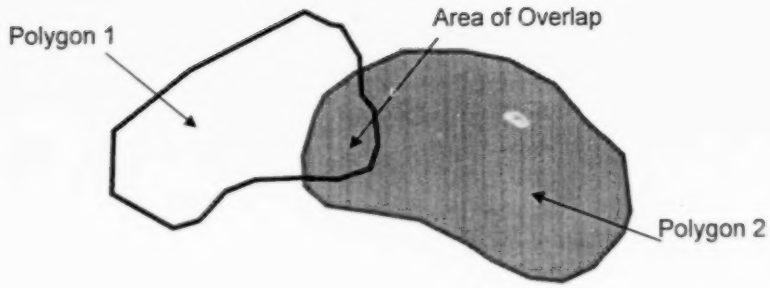
Spikes

In some cases spikes are formed during the preparation of data. Spikes are portions of lines or polygon edges that form sharp angles between three vertices. These spikes become individual polygons as automated processing occurs in many GIS or spatial processing systems.

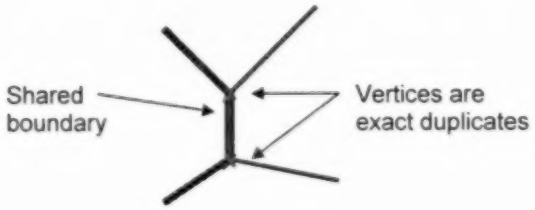


Overlapping Features

When dealing with multiple geometrics, overlap can occur and small slivers formed between geometrics. Where features follow a shared boundary, the vertices must be identical in both geometrics to ensure no slivers or overlaps occur.



When formatting shared boundaries in a CAD environment the same lines (a copy) should be used to form a boundary between features.

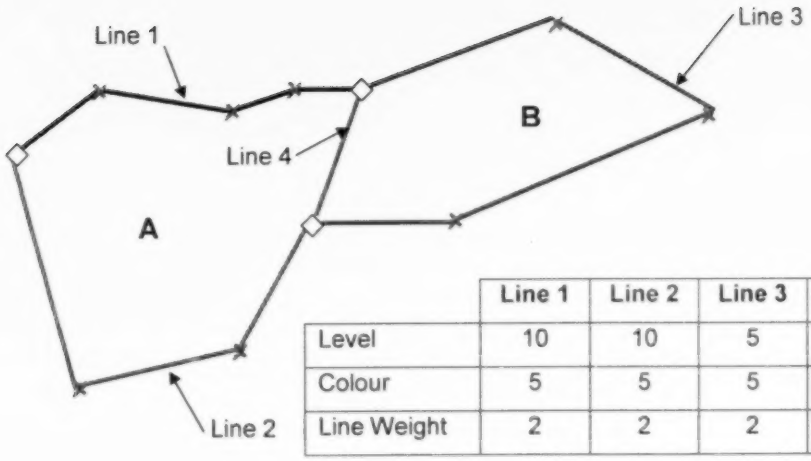


In Microstation using complex shapes to represent geometry makes ensuring the shared boundaries between features difficult. It is recommended that polygons are represented in Microstation using lines.

Using CAD to represent topology

CAD systems, such as Microstation do not support management of topology. This does not preclude using CAD systems for mapping for ESF submissions, but does require standardization of creating files and use of third party software. The management of topology and structures is one of the key things separating CAD systems and GIS systems.

Polygons can be represented in Microstation by using proper structure.



	Line 1	Line 2	Line 3	Line 4
Level	10	10	5	10
Colour	5	5	5	5
Line Weight	2	2	2	2

Polygon A is formed by lines 1, 2 and 4 as they all have the same level, line weight and color (other factors can be used to relate lines into polygons). Polygon B cannot be created because there is no way to relate color, line weight, and level to form a polygon. Polygon B is difficult to determine even though it "looks" right based on the fact that line 3 is on a different level from all other lines. Using CAD attributes help data conversion tool create topological relationships.

There are many ways to create topological relationships in a CAD environment, but they require the development and consistent application of standards. It is recommended that organizations wishing to use CAD tools to map data for submission consult an expert to create standards to create the structures necessary to properly convert into GML.

Amendments to

Forest Industry Guide to the Preparation and Submission of Forest Tenure and Permit Documents via the Electronic Submission Framework (ESF)

Date	Section
January 15, 2004	3.7, 3.7.1